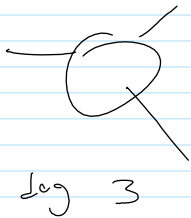
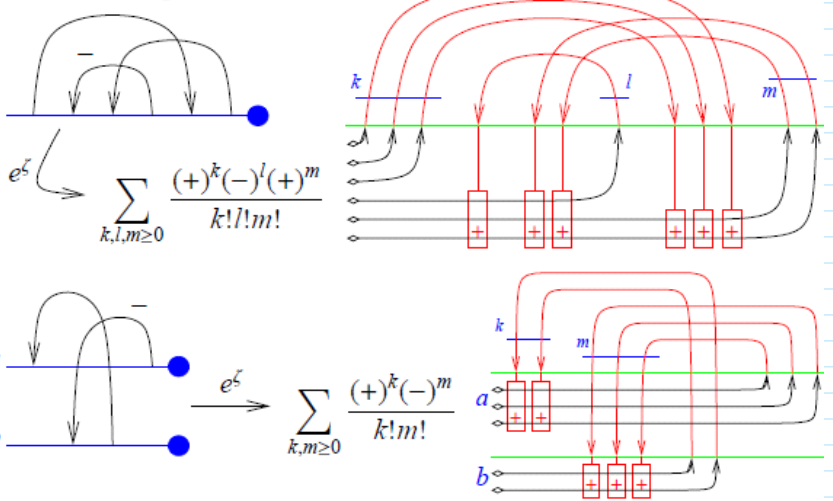
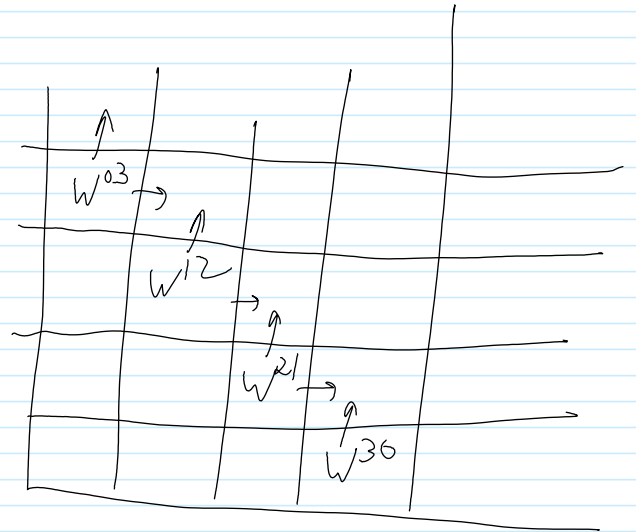
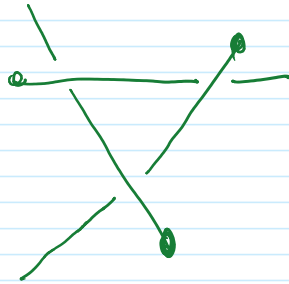
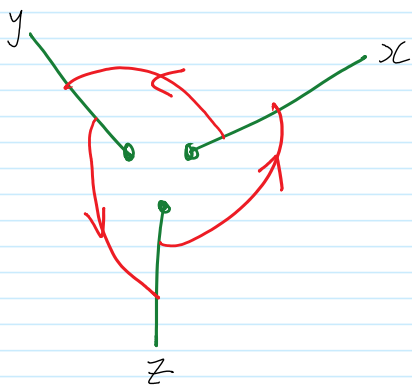


Theorem 1 (with Cattaneo (credit, no blame)). In the ribbon case,  $e^{\mathcal{L}}$  can be computed as follows:



Are there  $(\mathbb{S}^2 \times \mathbb{S}^1)$ -valued  
for ribbon 2-knots?

direction-of-view maps  
I need a better name  
for that.  
"direction map"?  
"bearing map"?



Infra-red matters!

$$d\theta = \frac{x dy - y dx}{x^2 + y^2}$$

$$= \underbrace{\frac{-y dx}{x^2 + y^2}}_{W^{10}} + \underbrace{\frac{x dy}{x^2 + y^2}}_{W^{01}}$$